

Obesity as an Independent Risk Factor for Carbuncle: A Case Report

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Abstract

Carbuncles typically arise in immunocompromised individuals, particularly those with poorly controlled diabetes. This case study discusses a 33-year-old man who developed a carbuncle despite having no significant immunocompromising conditions other than obesity. The under-recognition of obesity as an independent risk factor may contribute to delayed diagnosis and treatment, potentially increasing patient morbidity and mortality. This case highlights the need for early recognition and prompt management of carbuncles in obese patients, even in the absence of traditional risk factors.

Introduction

Carbuncles are a type of skin and soft tissue infection (SSTI) primarily caused by *Staphylococcus aureus* [1,2]. They result from the coalescence of multiple furuncles, characterized by necrotizing folliculitis with extension into adjacent subcutaneous tissues [3,4]. These infections commonly occur in immunocompromised individuals, particularly those with poorly controlled diabetes mellitus [1,2,5]. Obesity, defined as a body mass index (BMI) greater than 30, is further categorized into Class I, II, and III based on severity [7]. It is well established that obesity increases the risk for a broad range of medical conditions, including cardiovascular disease, metabolic syndrome, and impaired wound healing [8,9,10]. This case highlights the role of obesity as an independent risk factor in the development of soft tissue infections, specifically carbuncles, in the absence of other classical immunocompromising conditions.

Case Study

Patient history:

Mr. A (pseudonym), a 33-year-old gentleman with no known medical illnesses, presented to our clinic with a five-day history of a rapidly enlarging, painful swelling over the left anterior abdominal wall, accompanied by purulent discharge. He denied any preceding trauma, insect bite, or local skin injury.

Examination:

Physical examination revealed an erythematous, tender, and indurated swelling measuring approximately 5 × 5 cm over the left anterior abdominal wall, with multiple sinus openings discharging pus. These features

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were consistent with a clinical diagnosis of carbuncle [1]. Anthropometric measurements showed a weight of 140 kg, height of 183 cm, and a BMI of 41.8, classifying him as Class III obese. On examination, there is an erythematous, tender and firm swelling measuring 5x5cm over left anterior abdominal wall, with multiple openings with purulent discharge. These descriptions are consistent with findings of a carbuncle [1]. Anthropometric measurements revealed weight of 140kg, height of 183cm and BMI 41.8 (Class III obesity).

Investigations:

Laboratory findings demonstrated a mildly elevated white cell count with neutrophilic predominance. HbA1c was consistently below 5.8% both prior to and during this presentation, suggesting normoglycemia. HIV screening was negative. Other routine blood parameters were within normal limits. Radiological imaging was not performed due to the patient's refusal.

Procedure:

Following informed consent, excision of the carbuncle was performed under local anesthesia. Infected and necrotic tissues were completely debrided. Intraoperative specimens, including pus and tissue, were sent for bacterial culture and sensitivity. The wound was thoroughly irrigated with normal saline and left open for healing via secondary intention. Wound dressing with silver alginate was applied, and empirical broad-spectrum antibiotics were initiated.

Review and Follow up:

Culture and sensitivity results identified methicillin-resistant *Staphylococcus aureus* (MRSA). The patient was stepped down to targeted antibiotic therapy with oral doxycycline for 10 days. Granulation tissue formation was observed by postoperative day 7, with full wound epithelialization achieved by day 30. The patient recovered uneventfully without complications.

Discussion

This case demonstrates a potential correlation between obesity and an increased risk of developing carbuncles, even in the absence of other classical immunocompromising conditions. Obesity has been shown to impair immune function and increase susceptibility to infections [11–14]. It contributes to dysregulation of the skin microbiome, abnormal bacterial colonization, and delayed wound healing [14]. These factors may collectively compromise the skin's barrier and immune defenses, increasing the risk of cutaneous infections [15]. Carbuncles are primarily caused by bacterial pathogens, most commonly *Staphylococcus aureus* [1,2,16]. They are typically associated with immunocompromised states, such as poorly controlled diabetes mellitus [1,2,5], and can lead to significant morbidity and, in some cases, mortality if not promptly recognized and treated [2,6]. This case underscores the

importance of recognizing obesity as a potential independent risk factor for severe soft tissue infections such as carbuncles. Early identification of at-risk individuals and timely intervention are critical to minimizing complications and improving clinical outcomes [17].

Conclusion

This case illustrates the potential role of obesity as an independent risk factor in the development of carbuncles, even in the absence of traditionally recognised immunocompromising conditions such as diabetes. Given the rising global prevalence of obesity, it is important for clinicians to maintain a high index of suspicion for serious soft tissue infections in obese patients. Early diagnosis and timely management are crucial to reduce morbidity and prevent complications. Emphasis should also be placed on implementation of effective weight management strategies as part of long term preventive care to reduce the risk of skin and soft tissue infections.

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